

GloSSAC Product Quality Summary

This statement applies GloSSAC v1.1 data products.

General Comments:

Despite some limitations, we believe that this is by far the best data set in this series of data sets (ASAP, CCMI). Compared to previous releases of the data set such as ASAP or the set for CCMI in 2014, we have implemented a number of major improvements. These include the handling of the Pinatubo SAGE II saturation period in 1991 to 1993, the way in which missing values at high latitudes are filled during the entire SAGE II period, and how the post SAGE II period is constructed using OSIRIS and CALIPSO. The data set is focused on providing as close to measured aerosol optical properties as possible. While continuity problems between instruments, temporal/spatial gaps, and the desire to produce as seamless, gap-free data set prohibits reporting just measurements and empirically-derived corrections are employed, all data from their original sources are preserved (at GloSSAC resolution) within the data set.

The change to version 1.1 is solely to correct an error in the way the CLAES data is incorporated into the long-term data record that caused some large errors in the lower stratosphere between July 1991 and April 1993. We recommend that all GloSSAC users update to version 1.1.

For users, we recommend the following practices for this data set:

- For validation of aerosol properties derived within a chemistry-climate model, we suggest that the most robust comparisons are with the measurements directly. As a result, we suggest that they use the data flags to identify which values in the data set and compare model-derived parameters with those identified as measured and not indirectly inferred values.
- We have not focused on the derivation of bulk aerosol properties within this data set though it is suitable for that process. Even though values are reported at 525 and 1020 nm for every grid box, it is critical to recognize when data are based on a single measurement wavelength. This includes everything outside the SAGE II period and some data gap periods within the SAGE II period primarily associated with Pinatubo. Users who wish to use this data set for developing climatologies of aerosol properties are welcomed to do so as well as distribute any products derived from your effort. We would appreciate attribution of the source material.

The summary of key issues associated with the data set:

- The Summer of 1991 in the tropics is poorly resolved due to the loss of SAGE II in the lower stratosphere and CLAES data do not become available until October of that year. In any case, the highly inhomogeneous state of the stratosphere in the several months following the SAGE II eruption makes a monthly depiction of questionable validity.
- The OSIRIS/CALIPSO period presents two issues. There is clearly an issue with converting measurements for 525 nm to 1020 nm and the later data should be used very cautiously. This is a one wavelength period where only 525 nm values should be used. Also there are high levels of aerosol extinction in the lower stratosphere throughout this segment of the data set. While we cannot exclude that it is correct, users should exercise caution with these data.
- Data in the troposphere is only reported during the SAGE II period and only away from the Pinatubo eruption. It is likely that there is considerable aerosol in the upper troposphere during



this period but we have little ability to produce values based on measurements in this period. While tropospheric aerosol is not the general area of concern for GloSSAC, it is likely that volcanic aerosol in the upper tropical troposphere plays a role in changing climate during the aftermath of the Pinatubo eruption.

In the future, we will look at other newer data sets particularly the available SCIAMACHY data set but also aerosol products from OMPS and AerGOM. We may look into deriving data at a higher temporal resolution to more fully utilize the data afforded by OSIRIS and CALIPSO.

